BEST AVAILABLE RETROFIT TECHNOLOGY (BART) EXEMPTION MODELING DEMONSTRATION

Submitted By:

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1. INTRODUCTION

Smurfit-Stone Container Enterprises, Inc. (d/b/a Smurfit-Stone Container Corporation) operates a Kraft pulp and paperboard mill located in West Point, Virginia ("Smurfit-Stone" or "the Mill"). The Mill is a major source as defined by the federal operating permit program (40 CFR Part 70, codified in Virginia as 9 VAC 5 Chapter 80, Part II Article I) and the federal new source review (NSR) program (40 CFR Part 52, codified in Virginia as 9 VAC 5 Chapter 80 Part II Article 8). The Mill is subject to the Regional Haze Rules listed at 40 CFR Part 51.308 which references guidelines in 40 CFR Part 51 Appendix Y (Federal Register, 2005) for conducting a Best Available Retrofit Technology (BART) evaluation.

States have the option under the Regional Haze Rules to screen BART eligible sources to determine if they can be reasonably expected to cause or contribute to visibility impairment in Class I areas. The Virginia Department of Environmental Quality, (VADEQ), under the guidance of the southeast states' regional planning organization, The Visibility Improvement State and Tribal Association of the Southeast (VISTAS), has elected to proceed along this path. If a BART eligible source can demonstrate through a visibility modeling analysis that the source does not cause or contribute to visibility impairment in any Class I area, then the source can be considered exempt from a requirement to conduct a complete BART control evaluation.

Smurfit-Stone has prepared this BART exemption modeling report to VADEQ demonstrating that the BART eligible sources at the Mill do not cause or contribute to visibility impairment. This analysis follows procedures outlined in the BART exemption modeling protocol submitted to VADEQ in May 2006, and approved July 19, 2006, with minor deviations noted. These deviations were the result of revisions to guidance from VISTAS since the submission of the exemption modeling protocol and receipt of comments regarding the emissions inventory of visibility impairing pollutants from the BART eligible units.

This BART exemption modeling demonstration report includes the following sections:

Section 2 Description of the West Point Mill

Section 3 Emissions Inventory

Section 4 Visibility Modeling Approach and Technical Information

Section 5 Visibility Modeling Results

Section 6 References

Appendix A – Emissions Calculations Supporting Information

Appendix B – CALPUFF Modeling Files

2. DESCRIPTION OF THE WEST POINT MILL

This section contains general information on the manufacturing process and a description of the geographic and topographic setting of the Mill.

2.1 MILL LOCATION

The Smurfit-Stone West Point Mill is a Kraft pulp mill manufacturing corrugated medium and linerboard. The Mill is located in the town of West Point in King William County, Virginia, approximately 58 km east of Richmond, VA. A facility location map is provided in Figure 2-1. The geographical coordinates for the approximate center of the processing area of the Mill are:

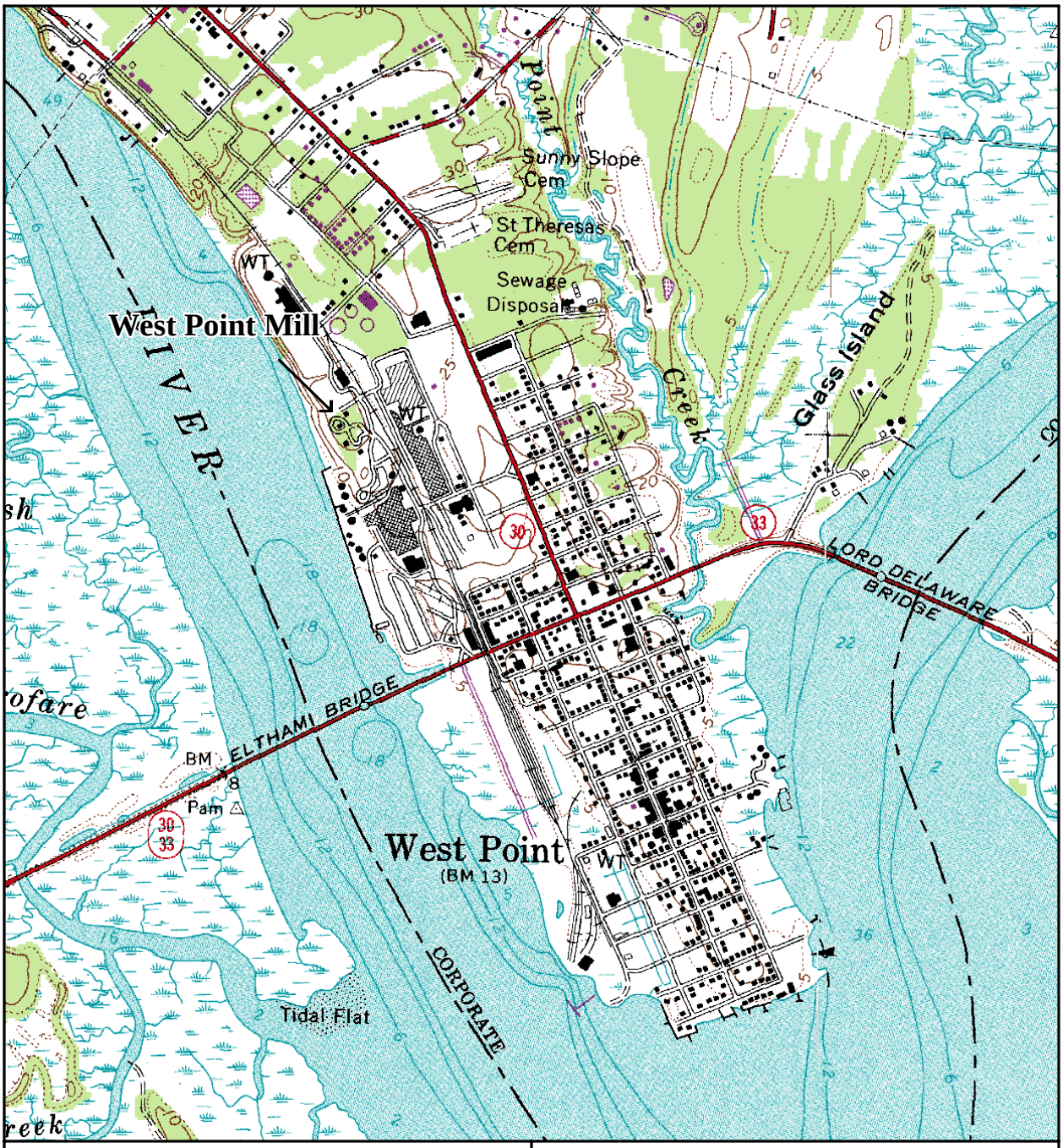
- Universal Transverse Mercator (UTM) Easting: 340,440 meters
- Universal Transverse Mercator (UTM) Northing: 4,155,911 meters
- UTM Zone : 18
- North American Datum (NAD): 1927

2.2 LOCATION OF CLASS I AREAS

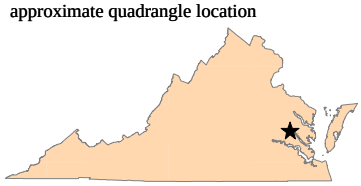
Per VISTAS guidelines, visibility impacts have been evaluated for the following Class I areas within a 300 km radius of the Mill (distance measured from the No. 8 Power Boiler stack to the closest point in the Class I area):

- Brigantine Wildlife Refuge – 296 km
- Shenandoah National Park – 169 km
- Dolly Sods Wilderness – 273 km
- Otter Creek Wilderness – 293 km
- James River Face Wilderness – 228 km
- Swanquarter National Wildlife Refuge – 235 km

A map showing the locations of the Class I areas and the Mill is provided in Figure 2-2



approximate quadrangle location



0 0.5 1

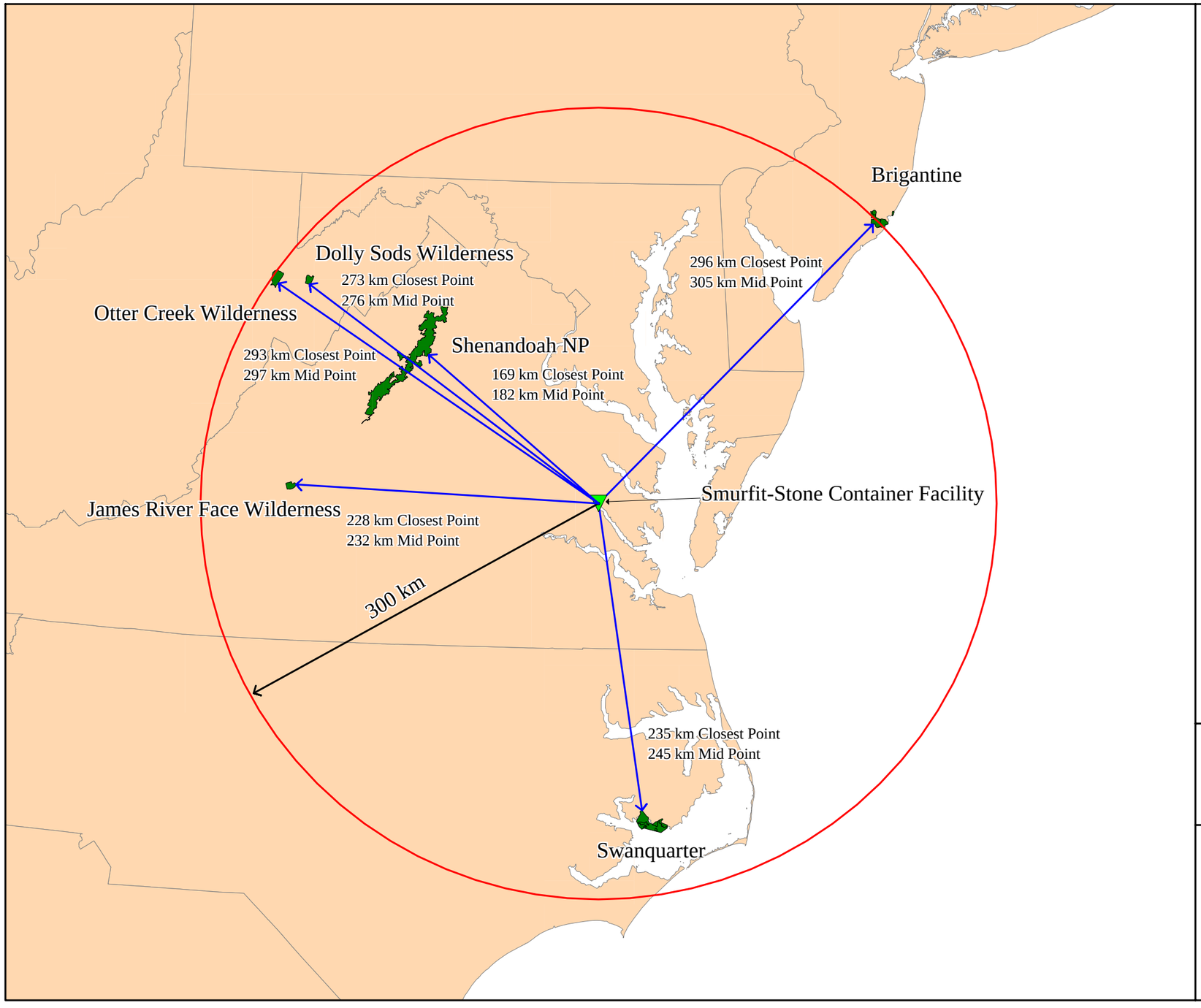
kilometers

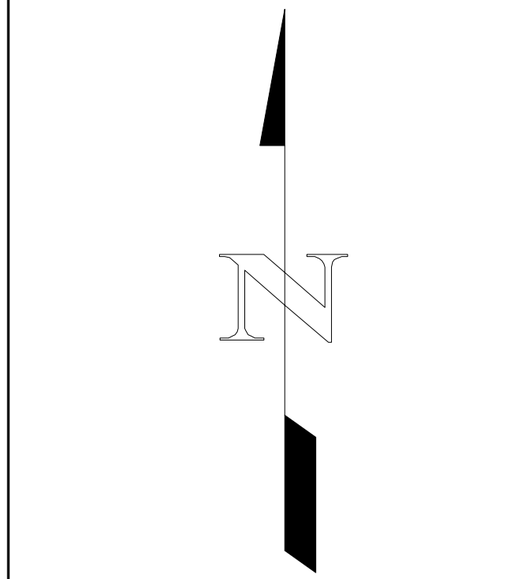
N

Based on USGS 1:24,000 topographical map for West Point, Virginia 1986.

Smurfit-Stone Container Enterprises, Inc.
West Point, Virginia Mill

Figure 2-1
Facility Site Map





Class I Areas Within 300 km of Facility

Figure 2-2
Smurfit-Stone Container Enterprises, Inc.
West Point, Virginia

3. EMISSIONS INVENTORY

This section identifies the BART eligible units at the Mill and provides an overview of the emissions data that were used in the BART exemption modeling demonstration.

3.1 BART ELIGIBLE SOURCES

According to the final Regional Haze Regulations and Guidelines for BART Determinations published on July 6, 2005 in the Federal Register, an emissions unit is considered BART eligible if all the following criteria are met:

- The emissions unit was installed between August 7, 1962 and August 7, 1977;
- The potential emissions are 250 tpy or greater of at least one visibility impairing pollutant across all BART eligible units (VISTAS defines visibility impairing pollutants as SO_2, NO_X, H_2SO_4, PM_{10} and PM_{10} sub-species, and NH_3.), and;
- The unit falls within one of the 26 listed source categories summarized in the guidance.

The BART eligible emissions units at the Mill that are addressed in the exemption modeling demonstration are:

- No. 8 Power Boiler (No. 8 PB)
- No. 4 Recovery Furnace (No. 4 RF)
- No. 4 Smelt Dissolving Tank (No. 4 SDT)
- No. 15 Lime Slaker

These emissions units have been identified by the Virginia Department of Environmental Quality (VADEQ) as meeting the emissions and installation date criteria for BART. These are the only emissions units at the Mill that were included in the BART exemption modeling demonstration.

Other emissions units at the West Point Mill meet the BART eligibility criteria, but are sources of VOC only. VISTAS concluded that VOC emissions should not be subject to BART, as stated in Section 4.1.3 of the VISTAS Modeling Protocol. These VOC only emissions units at the West Point Mill are:

- No. 1 Paper Machine
- No. 2 Paper Machine
- No. 4 Salt Cake Mix Tank
- No. 2 Line Primary Rejects A/B Tank
- Primary Screen Supply Tank
- Secondary Fiber Plant
- Waste Water Treatment System
- Waste Water System Heat Stripper

Emissions from these units were not considered in the visibility modeling analysis of the West Point Mill.

VISTAS has concluded that only large sources of ammonia (i.e., BART eligible emissions of ammonia with a potential to emit of greater than 250 tpy) need to consider ammonia emissions in any visibility modeling analysis for BART. The West Point Mill is not a large source of ammonia and has not addressed ammonia in this BART exemption modeling demonstration.

3.2 EMISSION RATES

The emission rates of visibility impairing pollutants from each BART eligible emission unit addressed in the exemption modeling demonstration are summarized in Table 3-1. Smurfit-Stone has based the emissions estimates on the highest 24-hour average actual

Table 3-1

Maximum 24-hr Average Emission Rates - BART Eligible Sources

Smurfit-Stone Container Enterprises - West Point Mill

Source Name	SO_2 Emissions	H_2SO_4 Emissions	NO_x Emissions	PM_{10} Emissions[(a)]	$PM_{2.5}$ Emissions[(a)]	NH_3 Emissions
	g/s	g/s	g/s	g/s	g/s	g/s
No. 8 Power Boiler	18.12	1.01	33.76	2.96	2.41	0.002
No. 4 Recovery Furnace	20.67	0.06	8.78	0.06	0.05	0.00
No. 4 Smelt Dissolving Tank North Stack	0.00	0.00	0.12	0.36	0.33	0.43
No. 4 Smelt Dissolving Tank South Stack	0.00	0.00	0.12	0.36	0.33	0.43
No. 15 Lime Slaker	0.00	0.00	0.00	0.04	0.04	0.47

[(a)] These emission rates will not actually be included in the CALPUFF modeling analysis. An emission rate of PM_{10} represents all condensable and filterable particulate emissions less than 10 microns in diameter (Including $PM_{2.5}$). An emission rate of $PM_{2.5}$ represents all condensable and filterable particulate emissions less than 2.5 microns in diameter. They are included for completeness purposes only. The PM emission rates used in the CALPUFF modeling analysis are refined into six different size categories. The sum of the PM emissions from the various size categories matches the value shown in this table.

emission rate of visibility impairing pollutants during the most recent three to five years. This approach is consistent with the guidelines in 40 CFR Part 51, Appendix Y. Except for No. 8 Power Boiler, the Mill relied on the following data, shown in order of priority, to establish the highest 24-hour average actual emission rates:

- Continuous Emission Monitoring System (CEMS) data
- Daily production and fuel throughputs combined with site-specific emission factors;
- Daily production and fuel throughputs combined with National Council for Air and Stream Improvement (NCASI) pulp and paper industry-specific emission factors;
- Daily production and fuel throughputs combined with USEPA AP-42 emission factors.

Where NCASI emission factors were used, the median values were selected in cases where both a mean and median value were available. Production and fuel throughput data were obtained from the Mill's accounting records.

The emission rates provided for the No. 8 Power Boiler reflect the limits in VADEQ Permit No. 40126051906 authorizing construction of a wet gas scrubber for control of PM and SO_2 emissions. The scrubber is being installed pursuant to a Consent Decree agreed to by VADEQ, USEPA, and Smurfit-Stone and entered by the District Court (E.D. Va.) in Civil Action No. 3:04-CV-647 on November 4, 2004. The Consent Decree requires that the scrubber be installed prior to November 4, 2007, which will ensure that the unit is in operation before the date that VADEQ is required to submit the State Implementation Plan revision for Regional Haze to the USEPA (December 17, 2007).

Smurfit-Stone originally submitted the detailed supporting documentation of all the emission rates for each BART eligible unit to VADEQ on April 27, 2006. That documentation is now included in Appendix A and summarized in Table 3-1. Smurfit-Stone received comments from VADEQ and the National Park Service (NPS) concerning

the speciation of PM in the emissions inventory. Consequently, the changes shown in Table 3-2 were made to the original inventory. With these changes made, VADEQ approved the emissions inventory on July 19, 2006.

Table 3-2

Emissions Inventory Changes

Emissions Unit	Original Emissions Inventory	Final Emissions Inventory
No. 8 Power Boiler	No elemental carbon emissions assumed.	3.7% of filterable particulate assumed to be elemental carbon.
No. 8 Power Boiler	All condensable particulate emissions assumed to be inorganic in nature.	All non-H_2SO_4 condensable particulate assumed to be organic in nature.
No. 4 Recovery Furnace	Total filterable particulate stack test emission factor of 0.4974 lb/TBLS was used.	The original stack test emission factor was for a control device malfunction scenario. Therefore, a recent stack test emission factor of 0.0036 lb/TBLS, representative of normal operation was used.
No. 4 Recovery Furnace	A condensable PM emission factor of 0.4429 lb/TBLS from NCASI was used.	The NCASI emission factor was scaled down based on the total filterable particulate emissions factor.
No. 4 Recovery Furnace	No elemental carbon emissions assumed.	1.53% of filterable particulate assumed to be elemental carbon.

The change in assumption for the No. 4 RF condensable PM emissions (organic vs. inorganic in nature) is due to a comment from NPS that was not among the comments approved by VADEQ in their July 19, 2006 letter. Smurfit-Stone has decided to include this comment in the final version of the emissions inventory to represent a more conservative approach in characterizing the PM emissions from the No. 4 RF.

3.3 STACK CHARACTERISTICS

The stack characteristics for the BART eligible sources are provided in Table 3-3. These data are representative of actual operating conditions. The stack coordinates shown are in the Universal Transverse Mercator Projection for Zone 18, as well as the Lambert-Conformal Conic (LLC) coordinates calculated using the domain origin of 40 north latitude and 97 west longitude. These LLC coordinates were input into the CALPUFF model.

The VISTAS Modeling Protocol states that sources that are not within 50 km of a Class I area can exclude building downwash effects in the visibility modeling analysis. As shown in Section 2.2, the Mill is not located within 50 km of any Class I area; hence, no building downwash information is included in this analysis.

Table 3-3
Stack Characteristics - BART Eligible Sources
Smurfit-Stone Container Enterprises - West Point Mill

Source Name	UTM E	UTM N	Stack Height	Base Elevation	Stack Diameter	Stack Gas Exit Velocity	Stack Gas Exit Temp.
	km	*km*	*m*	*m*	*m*	*m/s*	*K*
No. 8 Power Boiler	340.44	4155.911	53.35	1.8	2.74	18.36	333.15
No. 4 Recovery Furnace	340.54	4155.970	82.30	3.1	3.71	14.11	444.26
No. 4 Smelt Dissolving Tank North Stack	340.51	4156.018	85.06	3.1	1.37	6.40	333.15
No. 4 Smelt Dissolving Tank South Stack	340.51	4155.997	85.06	3.1	1.37	6.40	333.15
No. 15 Lime Slaker	340.41	4155.981	30.79	1.5	0.91	3.89	302.32

4. VISIBILITY MODELING APPROACH AND TECHNICAL INFORMATION

This section contains information on the technical approach that was followed in the visibility modeling study. The technical approach follows the guidance established in the VISTAS Modeling Protocol (VISTAS 2005) and outlines the configurations for CALMET and CALPUFF that were used to model the BART sources at the Mill.

4.1 CALMET CONFIGURATION

CALMET was configured by VISTAS as outlined in Section 4.4 of the VISTAS modeling protocol. VISTAS ran CALMET using both gridded prognostic meteorological data (MM5), as well as observations from surface and upper air stations, to create a 4-km resolution CALPUFF-ready three dimensional meteorological data set. VISTAS ran CALMET in this fashion for 2001, 2002, and 2003. It should be noted that the 4-km CALMET data differ significantly from the 12-km CALMET data that was also provided by VISTAS. The 12-km data were created from a CALMET run that considered prognostic data only, with no observations included. This so-called "No-Obs" mode is a less refined application of CALMET. For this reason, Smurfit-selected the more refined 4-km CALMET data that have been provided by VISTAS. Smurfit-Stone did not modify the 4-km CALMET files in any way. The CALMET Domain No. 5, as shown in Figure 4-4 of the VISTAS modeling protocol, was used in this analysis. This domain is sufficiently large enough to model the Mill and all Class I areas of concern. Smurfit-Stone acquired Domain No. 5 from VADEQ in April 2006.

4.2 CALPUFF CONFIGURATION

The following configurations were used, as outlined in Sections 4.3.3 and 4.4.2 of the VISTAS Modeling Protocol:

- CALPUFF Version 5.754 was used in the analysis;
- No building downwash considered;

- Modeled species: SO_2, H_2SO_4, NO_X, and PM_{10} (including sub-PM_{10} speciations) from the BART eligible sources at the Mill were used;
- The CALPUFF computational domain was set equal to the extents of the meteorological domain, VISTAS Domain No. 5;
- The receptor grids developed by the National Park Service for the Brigantine Wildlife Refuge, Shenandoah National Park, Dolly Sods Wilderness, Otter Creek Wilderness, James River Face Wilderness, Swanquarter National Wildlife Refuge were used. Class I area receptors were referenced to the origin of 40 N and 97 W lat/long to define the LLC projection;
- The Pasquill-Gifford (PG) dispersion option was used;
- Observed non-urban ozone data for the 2001-2003 CASTnet and AIRS monitoring networks were used,
- A background ammonia concentration of 0.5 ppb was used, and;
- CALPUFF was run for one emissions unit at a time, with a unity emission rate for each of the six discrete particulate matter size categories. The six size categories allow for the particulate matter to be modeled with their actual geometric mean diameters, which can effect dispersion. Representing particulate matter emissions in this fashion was suggested by VISTAS for use in BART visibility modeling analyses. The actual mass emission rates of particulate were entered during the POSTUTIL postprocessing step, as described below.

4.3 CALPOST AND POSTUTIL CONFIGURATION

CALPOST and POSTUTIL were configured to estimate visibility impacts at each Class I area. The settings used for CALPOST and POSTUTIL are consistent with those proposed in the visibility modeling protocol approved on July 19, 2006 with one exception. In the original protocol, Smurfit-Stone did not propose to use the Ammonia Limiting Method (ALM) that had been identified by VISTAS and included background ammonia concentration data from a Community Multi-Scale Air Quality (CMAQ) model run. These CMAQ data were never made available, so Smurfit-Stone chose to remove it from consideration at the time the visibility modeling protocol was submitted.

Subsequently, Smurfit-Stone decided to reconsider the use of ALM by applying the default background ammonia concentration of 0.5 ppb in order to produce a more refined visibility modeling analysis. The use of the ALM method to repartition nitrate formation using POSTUTIL and applying the default ammonia background concentration of 0.5 ppb eliminates overestimating nitrate formation through chemical reactions with modeled NO_X and background ammonia. By utilizing ALM, ammonia scavenging effects from all modeled puffs are considered so the total available background ammonia is not overestimated.

The following are the configurations and methodology used:

- CALPOST Version 5.6393 and POSTUTIL Version 1.43 were used in the analysis, with two iterations of POSTUTIL being performed;
- The first POSTUTIL iteration reclassified the modeled particulate into four particulate matter species: course filterable particulate (PMC), fine filterable particulate and non organic condensables (SOIL), organic condensables (SOA), and elemental carbon (EC). Actual emissions of these pollutants were input into POSTUTIL, since the CALPUFF runs used unity emission rates. The resulting concentration output from this iteration of POSTUTIL represented the complete particulate matter concentration profile for each emission unit individually;
- The second POSTUTIL run repartitioned the nitrate formation calculated in the original CALPUFF concentration file by combining the POSTUTIL concentration files from each emissions unit, summing their concentration profiles, and recalculating total modeled nitrate concentration based on available background ammonia (i.e., "ALM"). The concentration output file produced by this second iteration of POSTUTIL represented the modeled concentration from all emission units combined. The default background ammonia concentration of 0.5 ppb was used as part of the ALM;
- For each Class I area, CALPOST visibility method 6 with a Class I area specific monthly relative humidity values (f[RH]) was used, and;
- Natural background light extinction values were calculated using data from USEPA's "Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Program", (USEPA 2003) guidance document. Average background concentrations of sulfates, nitrates, organic

secondary aerosol, elemental carbon, soil, and coarse filterable particulate were taken from Table 2-1, while f[RH] factors were taken from Table A-3 of the USEPA 2003 document for each Class I area. A Rayleigh scattering efficiency of 10 Mm^{-1} was used for all Class I areas.

5. VISIBILITY MODELING RESULTS

The results of the visibility modeling analysis for each Class I area within 300 km of the Mill are summarized in Table 5-1. No impacts greater than 0.5 deciview over natural conditions occurred over the three year modeled period. These results demonstrate that the BART eligible units at the West Point Mill do not cause or contribute to visibility impairment at any Class I area within 300 km of the Mill. **Smurfit-Stone requests that VADEQ exempt the West Point Mill from any further analysis for BART.**

All CALPUFF modeling inputs and outputs, including all inputs and outputs from all the postprocessing steps, can be found on the attached CD-ROM in Appendix B of this report. Due to limited available space on the CD-ROM, the concentration profile files (*.con) are not included. The concentration files can be regenerated by any party reviewing this BART exemption demonstration by re-executing the batch files in each directory, starting with the CALPUFF model run first. The subsequent POSTUTIL and CALPOST steps need the previous step's concentration file, so they must be run in a sequential order:

1. CALPUFF,
2. POSTUTIL for PM speciation,
3. POSTUTIL for nitrate repartitioning and summing, and
4. CALPOST

A ReadMe file is included on the CD-ROM that explains the file naming conventions, along with a detailed description of the visibility modeling analysis files.

Table 5-1
Smurfit-Stone Container Enterprises
West Point, VA Mill
BART Exemption Visibility Modeling Results

Class I Area	2001		2002		2003	
	Delta-Deciview Ranks 1-8	Julian Day	Delta-Deciview Ranks 1-8	Julian Day	Delta-Deciview Ranks 1-8	Julian Day
Shenandoah National Park	0.336	334	0.134	284	0.287	78
	0.33	102	0.13	172	0.244	328
	0.166	141	0.122	252	0.19	345
	0.161	247	0.114	42	0.188	266
	0.154	332	0.106	86	0.166	88
	0.115	138	0.098	103	0.151	323
	0.115	215	0.092	80	0.144	258
	0.113	44	0.092	173	0.123	38
James River Face Wilderness	0.131	343	0.147	284	0.344	78
	0.123	44	0.124	353	0.255	323
	0.097	64	0.089	283	0.199	144
	0.072	215	0.079	251	0.094	145
	0.07	214	0.053	86	0.068	4
	0.065	247	0.052	112	0.056	232
	0.064	305	0.04	160	0.053	284
	0.063	323	0.04	252	0.049	71
Swanquarter National Wildlife Refuge	0.108	18	0.177	246	0.13	173
	0.095	361	0.137	341	0.123	343
	0.087	29	0.113	261	0.115	273
	0.079	236	0.107	331	0.096	344
	0.069	354	0.102	286	0.084	276
	0.062	322	0.099	332	0.077	68
	0.058	35	0.086	342	0.069	16
	0.055	303	0.074	247	0.067	228
Dolly Sods Wilderness	0.046	215	0.063	86	0.06	258
	0.046	334	0.059	175	0.056	323
	0.042	141	0.057	284	0.041	284
	0.033	102	0.047	172	0.037	233
	0.032	96	0.036	171	0.035	345
	0.032	247	0.033	252	0.029	136
	0.032	343	0.023	103	0.026	112
	0.026	216	0.02	275	0.02	77
Otter Creek Wilderness	0.05	141	0.057	284	0.052	323
	0.044	215	0.045	175	0.041	233
	0.033	96	0.044	172	0.037	284
	0.032	334	0.035	252	0.034	258
	0.027	343	0.034	86	0.026	4
	0.026	216	0.019	171	0.026	345
	0.026	252	0.019	173	0.021	266
	0.023	64	0.019	353	0.02	112
Brigantine Wildlife Refuge	0.324	333	0.25	7	0.195	364
	0.12	339	0.103	68	0.15	322
	0.114	267	0.081	248	0.126	282
	0.093	340	0.076	330	0.117	27
	0.084	324	0.068	85	0.114	51
	0.07	41	0.066	201	0.105	72
	0.069	216	0.066	231	0.1	81
	0.068	172	0.059	225	0.089	309

6. REFERENCES

1. Federal Register 2005 – 40 CFR Part 51, "Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations; Final Rule", Wednesday July 6, 2005.

2. VISTAS 2005 – "Protocol for the Application of the CALPUFF Model for Analyses of Best Available Retrofit Technology (BART)" – Visibility Improvement State and Tribal Association of the Southeast (VISTAS) (updated March 2006)

3. USEPA 2003 – "Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Program" – U.S. Environmental protection Agency Office of Air Quality Planning and Standards, EPA-454/B-03-005.

Appendix A - Emissions Calculations Supporting Information

Table A1
BART Emissions Inventory Summary
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT

Stack ID #	Company/Source	Location			Location UTM				Stack Height	Base Elevation	Diameter	Gas Exit Velocity	Stack Gas Exit Temp.	SO_2 Emissions	H_2SO_4 Emissions	NO_x Emissions	PM_{10} Emissions[a]	$PM_{2.5}$ Emissions[a]	NH_3 Emissions	particle speciation[b]		condensable				filterable											
																						organic condensable (OC)		inorganic condensable		COARSE		SOIL				Elemental Carbon[c] (EC)			
		latitude	longitude	Datum	UTM East	UTM North	UTM Zone	Datum												filterable PM_{10}	condensable PM_{10}	0.625-1.0 µm	0.5-0.625 µm	0.625-1.0 µm	0.5-0.625 µm	6-10 µm	2.5-6 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm
		deg.	deg.		km	km			ft	ft	ft	ft/s	deg F	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	%	%	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr
	No. 8 Power Boiler	37.5382	76.8060		340.44	4155.911	18	27	175	6.0	9.0	60.25	140.18	143.780	8.000	267.930	31.500	27.125	0.012	48%	26%	1.530	1.530	0.000	0.000	7.767	2.248	3.149	0.787	2.165	3.937	0.121	0.030	0.083	0.151
	No. 4 Recovery Furnace	37.5388	76.8048		340.54	4155.9701	18	27	270	10.0	12.2	46.31	340.18	164.051	0.480	69.722	0.946	0.899	0.000	17%	83%	0.028	0.028	0.127	0.127	0.014	0.030	0.027	0.013	0.024	0.045	0.000	0.000	0.000	0.001
	No. 4 Smelt Dissolving Tank North Stack	37.5392	76.8053		340.51	4156.0177	18	27	279	10.0	4.5	21.00	140.18	0.000	0.000	0.942	2.865	2.648	3.425	82%	18%	0.048	0.048	0.203	0.203	0.029	0.187	0.470	0.232	0.422	1.022	0.000	0.000	0.000	0.000
	No. 4 Smelt Dissolving Tank South Stack	37.5390	76.8052		340.51	4155.997	18	27	279	10.0	4.5	21.00	140.18	0.000	0.000	0.942	2.865	2.648	3.425	82%	18%	0.048	0.048	0.203	0.203	0.029	0.187	0.470	0.232	0.422	1.022	0.000	0.000	0.000	0.000
	No. 15 Lime Slaker	37.5390	76.8060		340.41	4155.981	18	27	101	5.0	3.0	12.76	84.69	0.000	0.000	0.000	0.292	0.292	3.722	100%	0%	0.000	0.000	0.000	0.000	0.000	0.000	0.073	0.073	0.073	0.073	0.000	0.000	0.000	0.000

Stack ID #	Company/Source	Location			Location UTM				Stack Height	Base Elevation	Diameter	Gas Exit Velocity	Stack Gas Exit Temp.	SO_2 Emissions	H_2SO_4 Emissions	NO_x Emissions	PM_{10} Emissions[a]	$PM_{2.5}$ Emissions[a]	NH_3 Emissions	particle speciation[b]		organic condensable (OC)		inorganic condensable		COARSE		SOIL				Elemental Carbon[c] (EC)			
		latitude	longitude	Datum	UTM East	UTM North	UTM Zone	Datum												filterable PM_{10}	condensable PM_{10}	0.625-1.0 µm	0.5-0.625 µm	0.625-1.0 µm	0.5-0.625 µm	6-10 µm	2.5-6 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm
		deg.	deg.		km	km			m	m	m	m/s	K	g/s	g/s	g/s	g/s	g/s	g/s	%	%	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s
	No. 8 Power Boiler	37.5382	76.8060		340.44	4155.911	18	27	53.35	1.8	2.74	18.36	333.15	18.12	1.01	33.76	3.97	3.42	0.002	48%	26%	0.193	0.193	0.000	0.000	0.979	0.283	0.397	0.099	0.273	0.496	0.015	0.004	0.010	0.019
	No. 4 Recovery Furnace	37.5388	76.8048		340.54	4155.9701	18	27	82.30	3.1	3.71	14.11	444.26	20.67	0.06	8.78	0.12	0.11	0.00	17%	83%	0.004	0.004	0.016	0.016	0.002	0.004	0.003	0.002	0.003	0.006	0.000	0.000	0.000	0.000
	No. 4 Smelt Dissolving Tank North Stack	37.5392	76.8053		340.51	4156.0177	18	27	85.06	3.1	1.37	6.40	333.15	0.00	0.00	0.12	0.36	0.33	0.43	82%	18%	0.006	0.006	0.026	0.026	0.004	0.024	0.059	0.029	0.053	0.129	0.000	0.000	0.000	0.000
	No. 4 Smelt Dissolving Tank South Stack	37.5390	76.8052		340.51	4155.997	18	27	85.06	3.1	1.37	6.40	333.15	0.00	0.00	0.12	0.36	0.33	0.43	82%	18%	0.006	0.006	0.026	0.026	0.004	0.024	0.059	0.029	0.053	0.129	0.000	0.000	0.000	0.000
	No. 15 Lime Slaker	37.5390	76.8060		340.41	4155.981	18	27	30.79	1.5	0.91	3.89	302.32	0.00	0.00	0.00	0.04	0.04	0.47	100%	0%	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.009	0.009	0.009	0.000	0.000	0.000	0.000

[a] These emission rates will not actually be included in the CALPUFF modeling analysis. An emission rate of PM_{10} represents all condensable and filterable particulate emissions less than 10 microns in diameter (Including $PM_{2.5}$). An emission rate of $PM_{2.5}$ represents all condensable and filterable particulate emissions less than 2.5 microns in diameter. They are included for completeness purposes only.

[b] For the BART eligible sources where both condensable and filterable PM_{10} are emitted, the percentages shown were calculated as follows:

condensable PM_{10} percentage = condensable emission rate/ (condensable emission rate + filterable emission rate)

filterable PM_{10} percentage = condensable emission rate/ (condensable emission rate + filterable emission rate)

[c] Due to the nature of the BART eligible sources at the Smurfit-Stone West Point Mill, no emissions of elemental carbon (i.e., unburned carbon, soot) are assumed. For the No. 8 Power Boiler, AP-42 Section 1.1.3 states that pulverized coal systems emit primarily inorganic ash residues as filterable particulate matter, due to the combustion characteristics of pulverized coal. For the No. 4 Recovery Furnace, NCASI literature and AP-42 describe the filterable particulate emissions as consisting largely of inorganic filterable material such as salts, and not unburned carbon.

Table A2

No. 8 Power Boiler BART Emissions Inventory

Smurfit-Stone Container Enterprises - West Point, VA Mill

MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
Ammonia	0.000565	lb/ton coal	FIRE version 6.23 emission factor database	0.012	0.002	
NO_X	267.93	lb/hr	Based on highest 24-hr average rolling CEMS value.	267.93	33.759	The highest 24-hr average rolling NOX emission rate occurred on April 21, 2005. The CEMS data was reviewed for the periods between December 20, 2004 and December 31, 2005. The Boiler is equipped with a low-NOX burner system that commenced operation on December 20, 2004.
SO_2	0.26	lb/MMBtu	Based on scrubber vendor guarantee and Consent Decree condition (U.S. District Court Civil Action No. 3:04-CV-647, condition 10).	143.78	18.116	
H_2SO_4	8.00	lb/hr	Based on scrubber vendor guarantee.	8.00	**1.008**	This value is used in the No. 8 PB PM Distribution Calculation Spreadsheet. The emissions of H_2SO_4 are subtracted from the calculated condensable particulate emissions.
Filterable PM_{10} - PM_6	13.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber, scaled to account for PM limit representing PM_{10} only.	2.66	0.335	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. 3.7% emissions of elemental carbon (soot) are assumed.
Filterable PM_6 - $PM_{2.5}$	15.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber, scaled to account for PM limit representing PM_{10} only.	3.07	0.386	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. 3.7% emissions of elemental carbon (soot) are assumed.
Filterable $PM_{2.5}$ - $PM_{1.25}$	23.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber, scaled to account for PM limit representing PM_{10} only.	4.70	0.592	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. 3.7% emissions of elemental carbon (soot) are assumed.
Filterable $PM_{1.25}$ - $PM_{1.0}$	5.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber, scaled to account for PM limit representing PM_{10} only.	1.02	0.129	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. 3.7% emissions of elemental carbon (soot) are assumed.
Filterable $PM_{1.0}$ - $PM_{0.625}$	16.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber, scaled to account for PM limit representing PM_{10} only.	3.27	0.412	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. 3.7% emissions of elemental carbon (soot) are assumed.
Filterable $PM_{0.625}$ - $PM_{0.5}$	28.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber, scaled to account for PM limit representing PM_{10} only.	5.72	0.721	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. 3.7% emissions of elemental carbon (soot) are assumed.
Organic Condensable $PM_{1.0}$ - $PM_{0.625}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	1.53	0.193	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that condensable particulate emissions for coal fired boilers is primarily inorganic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions from the condensable PM emissions calculated below from AP-42. Although published emission factor data suggest that these emissions are inorganic, Smurfit-Stone has conservatively assumed that these emissions are organic in nature, due to comments received from Don Shepherd of the National Park Service.
Organic Condensable $PM_{0.625}$ - $PM_{0.5}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	1.53	0.193	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that condensable particulate emissions for coal fired boilers is primarily inorganic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions from the condensable PM emissions calculated below from AP-42. Although published emission factor data suggest that these emissions are inorganic, Smurfit-Stone has conservatively assumed that these emissions are organic in nature, due to comments received from Don Shepherd of the National Park Service.
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM_{10}	31.5	lb/hr	Scrubber vendor guarantee and DEQ permit limit.	31.50	3.969	
Condensable PM	0.02	lb/MMBtu	AP-42 Table 1.1-5 for Bituminous and Subbituminous Coal Combustion with FGD Control.	11.06	**1.394**	This value is used in the No. 8 PB PM Distribution Calculation Spreadsheet.
Total Filterable PM_{10}	64.9%	% of total PM10	Assumed that the permit limit represents both filterable and condensable PM_{10}. The percentage filterable was found by subtracting out the condensable portion (based on an AP-42 factor for condensable PM) from the permit limit.	20.44	**2.575**	This value is used in the No. 8 PB PM Distribution Calculation Spreadsheet.
Total Filterable $PM_{2.5}$	51.0%	% of total PM10	AP-42 Table 1.1-6 for Dry Bottom Boilers Burning Pulverized Bituminous and Subbituminous Coal	16.07	2.024	

Throughput Data

553	MMBtu/hr	Heat Input rating
0.013	MMBtu/lb	Minimum monthly average for delivered coal
21.27	tons/hr	Hourly coal throughput at high heat input rating

Table A3
No. 8 Power Boiler BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

	total	filterable	condensable	condensable split H_2SO_4	condensable split condensable - H_2SO_4
%		N/A	N/A	72%	28%
(g/s)	**N/A**	2.58	1.39	1.01	0.39

			FILTERABLE						CONDENSABLE			
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	fine filterable inorganic (96.3% of fine filterable) (g/s)	fine filterable elemental carbon (3.7% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%)	PM800	6.00 - 10.00	38.0%	0.98	**0.9787**						6.00 - 10.00
	PM425	2.50-6.00	11.0%	0.28	**0.2833**						2.50-6.00
fine (57.6%)	PM187	1.25-2.50	16.0%	0.41		**0.3968**	**0.0152**				1.25-2.50
	PM112	1.00-1.25	4.0%	0.10		**0.0992**	**0.0038**				1.00-1.25
	PM081	0.625-1.00	11.0%	0.28		**0.2728**	**0.0105**		**0.1928**	**0.0000**	0.625-1.00
	PM056	0.50-0.625	20.0%	0.52		**0.4960**	**0.0191**		**0.1928**	**0.0000**	0.50-0.625
total			100%	2.58	**1.26** **PMC**	**1.26** **SOIL**	**0.05** **EC**	**1.01** **H_2SO_4**	**0.39** **SOA**	**0.00** **SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Table A4
No. 4 Recovery Furnace BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
NO_X	69.72	lb/hr	Based on 1997 emission test result of 51 lb NO_X/hr. The test results were scaled by ratioing the maximum average 24-hr rolling RF steam production (470,908 lb steam/hr)by the steam production rate from the test (344,460 lb steam/hr).	69.72	8.785	Representative BLS throughput data were not available from the 1997 emissions test. The ratio of steam production from the test compared to the historical maximum actual 24-hr average steam production was used to scale the emission rate.
SO_2	164.05	lb/hr	Based on 1997 emission test result of 120 lb SO_2/hr. The test results were scaled by ratioing the maximum average 24-hr rolling RF steam production (470,908 lb steam/hr)by the steam production rate from the test (344,460 lb steam/hr).	164.05	20.670	Representative BLS throughput data were not available from the 1997 emissions test. The ratio of steam production from the test compared to the historical maximum actual 24-hr average steam production was used to scale the emission rate.
H_2SO_4	0.008	lb/tons BLS	MedianValue from NCASI SARA 313 Handbook, Chemical-Specific Information for Sulfuric Acid.	0.48	**0.060**	This value is used in the No. 4 RF PM Distribution Calculation Spreadsheet. The emissions of H_2SO_4 are subtracted from the calculated condensable particulate emissions.
Filterable PM_{10} - PM_6	8.6%	% of Method 5 PM	Median value from NCASI Technical Bulletin 884 Table A11d for PM_{10} - AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP for PM_6	0.02	0.002	
Filterable PM_6 - $PM_{2.5}$	14.4%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	0.03	0.004	
Filterable $PM_{2.5}$ - $PM_{1.25}$	13.3%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	0.03	0.003	Elemental Carbon assumed to be 1.53% of fine filterable particulate. This value is from USEPA CMAQ speciation database, speciation code 22044.
Filterable $PM_{1.25}$ - $PM_{1.0}$	6.3%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	0.01	0.002	Elemental Carbon assumed to be 1.53% of fine filterable particulate. This value is from USEPA CMAQ speciation database, speciation code 22044.
Filterable $PM_{1.0}$ - $PM_{0.625}$	12.0%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	0.02	0.003	Elemental Carbon assumed to be 1.53% of fine filterable particulate. This value is from USEPA CMAQ speciation database, speciation code 22044.
Filterable $PM_{0.625}$ - $PM_{0.5}$	22.2%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	0.05	0.006	Elemental Carbon assumed to be 1.53% of fine filterable particulate. This value is from USEPA CMAQ speciation database, speciation code 22044.
Organic Condensable $PM_{1.0}$ - $PM_{0.625}$	18.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	0.03	0.004	
Inorganic Condensable $PM_{1.0}$ - $PM_{0.625}$	82.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	0.13	0.016	
Organic Condensable $PM_{0.625}$ - $PM_{0.5}$	18.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	0.03	0.004	
Inorganic Condensable $PM_{0.625}$ - $PM_{0.5}$	82.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	0.13	0.016	
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM (Method 5)	0.0036	lb/tons BLS	12/2/2003 EPA Method 5 Emissions Testing.	0.21	**0.026**	This value is used in the No. 4 RF PM Distribution Calculation Spreadsheet.
Condensable PM	0.0138	lb/tons BLS	Median value scaled from EPA Method 5 test data with CPM values shown in NCASI Technical Bulletin 884 Table A11d.	0.79	**0.099**	This value is used in the No. 4 RF PM Distribution Calculation Spreadsheet.
Condensable $PM_{1.0}$ - $PM_{0.625}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	0.15	0.019	The value shown here reflects the subtraction of H_2SO_4 emissions.
Condensable $PM_{0.625}$ - $PM_{0.5}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	0.15	0.019	The value shown here reflects the subtraction of H_2SO_4 emissions.
Total Filterable PM_{10}	76.8%	% of Method 5 PM	Median value from NCASI Technical Bulletin 884 Table A11d.	0.16	0.020	
Total Filterable $PM_{2.5}$	53.8%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	0.11	0.014	

Throughput Data

1370	tons BLS/day	Highest daily production value from 3/13/2004 to 4/12/2006
913	ADTP/day	Used Historic production ratio of 1.5 TBLs to 1 ADTP

Table A5
No. 4 Recovery Furnace BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

	total	filterable	condensable	condensable split H_2SO_4	condensable split condensable - H_2SO_4
%		N/A	N/A	61%	39%
(g/s)	**N/A**	0.03	0.10	0.06	0.04

		FILTERABLE						CONDENSABLE			
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	fine filterable inorganic (98.47% of fine filterable) (g/s)	fine filterable elemental carbon (1.53% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%)	PM800	6.00 - 10.00	6.8%	0.002	**0.0018**						6.00 - 10.00
	PM425	2.50-6.00	14.4%	0.004	**0.0037**						2.50-6.00
fine (57.6%)	PM187	1.25-2.50	13.3%	0.003		**0.00339**	**0.00005**				1.25-2.50
	PM112	1.00-1.25	6.3%	0.002		**0.00161**	**0.00002**				1.00-1.25
	PM081	0.625-1.00	12.0%	0.003		**0.00306**	**0.00005**		**0.0035**	**0.0160**	0.625-1.00
	PM056	0.50-0.625	22.2%	0.006		**0.00566**	**0.00009**		**0.0035**	**0.0160**	0.50-0.625
total			75%	0.02	**0.01**	**0.01**	**0.00**	**0.06**	**0.01**	**0.03**	
					PMC	**SOIL**	**EC**	**H_2SO_4**	**SOA**	**SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Table A6

No. 4 Smelt Dissolving Tank BART Emissions Inventory

Smurfit-Stone Container Enterprises - West Point, VA Mill

MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
NO_X	0.033	lb/tons BLS	Mean value from NCASI Technical Bulletin 884 Table 4.15, this is the value currently used by the Mill. The median value is 0.020 lb/TBLS.	1.88	0.237	
SO_2	0	lb/hr	Previous emission tests of the No. 4 Smelt Dissolving Tank indicate that SO_2 were below the detection limit.	0.00	0.000	
H_2SO_4	N/A			--	--	
Ammonia	0.12	lb/tons BLS	Mean value from NCASI Technical Bulletin 858 Table A-15. Median value not available.	6.85	0.863	
Filterable PM_{10} - PM_6	1.1%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.06	0.007	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable PM_6 - $PM_{2.5}$	7.1%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.37	0.047	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{2.5}$ - $PM_{1.25}$	17.8%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.94	0.118	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.25}$ - $PM_{1.0}$	8.8%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.46	0.059	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.0}$ - $PM_{0.625}$	16.0%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.84	0.106	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{0.625}$ - $PM_{0.5}$	38.7%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	2.04	0.257	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Organic Condensable $PM_{1.0}$ - $PM_{0.625}$	19.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.10	0.012	
Inorganic Condensable $PM_{1.0}$ - $PM_{0.625}$	81.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.41	0.051	
Organic Condensable $PM_{0.625}$ - $PM_{0.5}$	19.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.10	0.012	
Inorganic Condensable $PM_{0.625}$ - $PM_{0.5}$	81.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.41	0.051	
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM (Method 5)	0.0925	lb/tons BLS	3/2004 EPA Method 5 Emissions Testing	5.28	**0.665**	This value is used in the No. 4 SDT PM Distribution Calculation Spreadsheet.
Condensable PM	19.0%	% of Method 5 PM	NCASI Technical Bulletin 884 Table 4.15	1.00	**0.126**	This value is used in the No. 4 SDT PM Distribution Calculation Spreadsheet.
Condensable $PM_{1.0}$ - $PM_{0.625}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	0.50	0.063	
Condensable $PM_{0.625}$ - $PM_{0.5}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	0.50	0.063	
Total Filterable PM_{10}	89.5%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	4.73	0.595	
Total Filterable $PM_{2.5}$	81.3%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	4.29	0.541	

Throughput Data

1370 tons BLS/day Highest daily production value from 3/13/2004 to 4/12/2006. Daily production was not monitored prior to 3/13/2004 (i.e., Subpart MM compliance date)

Table A7
No. 4 Smelt Dissolving Tank BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

	total PM	filterable	condensable	condensable split H_2SO_4	condensable split condensable - H_2SO_4
%		N/A	N/A	0%	100%
(g/s)	**N/A**	0.67	0.13	0.00	0.13

		FILTERABLE						CONDENSABLE			
						fine filterable					
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	inorganic (100% of fine filterable) (g/s)	elemental carbon (0% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%)	PM800	6.00 - 10.00	1.1%	0.007	**0.0073**						6.00 - 10.00
	PM425	2.50-6.00	7.1%	0.047	**0.0472**						2.50-6.00
fine (57.6%)	PM187	1.25-2.50	17.8%	0.118		**0.1184**	**0.0000**				1.25-2.50
	PM112	1.00-1.25	8.8%	0.059		**0.0585**	**0.0000**				1.00-1.25
	PM081	0.625-1.00	16.0%	0.106		**0.1064**	**0.0000**		**0.0120**	**0.0512**	0.625-1.00
	PM056	0.50-0.625	38.7%	0.257		**0.2575**	**0.0000**		**0.0120**	**0.0512**	0.50-0.625
total			90%	0.60	**0.05**	**0.54**	**0.00**	**0.00**	**0.02**	**0.10**	
					PMC	**SOIL**	**EC**	**H_2SO_4**	**SOA**	**SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Table A8

No. 15 Lime Slaker BART Emissions Inventory

Smurfit-Stone Container Enterprises - West Point, VA Mill

MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
Ammonia	0.28	lb/ton CaO	MedianValue from NCASI SARA 313 Handbook, Chemical-Specific Information for Ammonia.	3.72	0.47	
Filterable PM_{10} - PM_{6}	0.0%	% of Method 5 PM		0.00	0.000	
Filterable PM_{6} - $PM_{2.5}$	0.0%	% of Method 5 PM		0.00	0.000	
Filterable $PM_{2.5}$ - $PM_{1.25}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.25}$ - $PM_{1.0}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.0}$ - $PM_{0.625}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{0.625}$ - $PM_{0.5}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM	0.022	lb/ton CaO	Median Value NCASI Technical Bulletin 884 Table A14b	0.29	**0.037**	This value is used in the No. 15 Lime Slaker PM Distribution Calculation Spreadsheet.
Condensable PM	0.0%	% of Method 5 PM	Assumed that condensable particulate emissions were negligible since the slaker is a wet source, and no emissions data identifying condensable particulate emissions from lime slakers are available.	0.00	**0.000**	
Total Filterable PM_{10}	100.0%	% of Method 5 PM	NCASI Technical Bulletin 884 Table A14b	0.29	0.037	
Total Filterable $PM_{2.5}$	100.0%	% of Method 5 PM	Conservatively assumed that all PM10 is less than 2.5 microns in diameter	0.29	0.037	

Throughput Data

13.29 ton CaO/hr Maximum throughput rate based on 319 tons CaO/day capacity.

Table A9
No. 15 Lime Slaker BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

condensable split

	total	filterable	condensable	H_2SO_4	condensable - H_2SO_4
%		N/A	N/A	0%	100%
(g/s)	**N/A**	0.04	0.00	0.00	0.00

		FILTERABLE						CONDENSABLE			
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	fine filterable inorganic (96.3% of fine filterable) (g/s)	fine filterable elemental carbon (3.7% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%)	PM800	6.00 - 10.00	0.0%	0.00	**0.0000**						6.00 - 10.00
	PM425	2.50-6.00	0.0%	0.00	**0.0000**						2.50-6.00
fine (57.6%)	PM187	1.25-2.50	25.0%	0.01		**0.0092**	**0.0000**				1.25-2.50
	PM112	1.00-1.25	25.0%	0.01		**0.0092**	**0.0000**				1.00-1.25
	PM081	0.625-1.00	25.0%	0.01		**0.0092**	**0.0000**		**0.0000**	**0.0000**	0.625-1.00
	PM056	0.50-0.625	25.0%	0.01		**0.0092**	**0.0000**		**0.0000**	**0.0000**	0.50-0.625
total			100%	0.04	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	
					PMC	**SOIL**	**EC**	**H_2SO_4**	**SOA**	**SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Appendix B – CALPUFF Modeling Files